

Remarks

In the Office Action dated March 27, 2002, the Examiner rejected claim 5 under 35 U.S.C. § 112, second paragraph. The Examiner rejected claims 1, 5, 7-9, 11, 13, 15, and 19-25 under 35 U.S.C. § 102 as being anticipated by the *Nguyen et al.* article entitled "Design and Performance of CMOS Micromechanical Resonator Oscillators." The Examiner rejected claims 1-13 and 15-25 under 35 U.S.C. § 102 as being anticipated by the U.S. patent to *Lin et al.*, 5,537,083. The Examiner rejected claim 14 under 35 U.S.C. § 103 as being unpatentable over *Lin et al.* in view of either the ordinary skill in the art or the U.S. patent to *Ella*, 6,278,342.

By this amendment, Applicant's attorney has amended the specification to indicate that one of the cross-referenced applications has now issued into U.S. Patent No. 6,249,073. Independent claim 5 has been amended to eliminate the language "a plurality of intercoupled micromechanical elements including a resonator" and the phrase "a first micromechanical resonator" has been inserted therefor.

With respect to the Examiner's statement regarding dimensions, amended claims 5 and 1 both require that the support structure and the resonator be dimensioned so that the resonator is isolated from the support structure during resonator vibration wherein energy losses to the substrate are substantially eliminated. This language in each of the independent claims particularly points out and distinctly claims the invention. This language in each of the independent claims also patentably defines over their prior art, taken either alone or in combination with one another.

The Examiner's attention at this time is directed towards claim 1 in the corresponding issued U.S. Patent No. 6,249,073, wherein claim 1 therein calls for a micromechanical resonator device as opposed to the micromechanical filter apparatus and method for filtering signals of the independent claims of the present application. The claims in U.S. Patent No. 6,249,073 clearly pass muster under 35 U.S.C. § 112 and, in like fashion, new amended claims 1 and 5 of the present application clearly pass muster under 35 U.S.C. § 112.

With respect to the prior art rejection under 35 U.S.C. § 102, as well as 35 U.S.C. § 103, the references cited by the Examiner, including the U.S. patent to *Lin et al.*, and the *Nguyen et al.* article (both of which were referenced in U.S. Patent No. 6,249,073), clearly fail to describe a support structure attached to a resonator and a resonator and a support structure both dimensioned so that the resonator is isolated from the support structure during resonator vibration. In this way, energy losses to the substrate are substantially eliminated. For example, the folded-beam in the folded-beam resonator of *Lin et al.* is not an isolating support. Rather, it is part of the resonator.

Regarding claims 26 and 27, none of the prior art has a resonator which has a Q greater than 5000 which is substantially higher than the Q of the prior art.

Regarding new claims 28-32, none of the prior art discloses one or more attachment locations which sustain substantially no translational movement during resonant vibration of the elements.

Consequently, in view of the above and in the absence of art, other than the art already of record, Applicant's attorney respectfully submits the application is in condition for allowance, which allowance is respectfully requested.

Respectfully submitted,

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Attachment

**VERSION WITH MARKINGS TO SHOW CHANGES MADE****In The Specification**

Please amend the paragraph beginning on page 1, at line 11, with the paragraph shown below:

This application is a continuation-in-part of copending U.S. patent application entitled "Device Including A Micromechanical Resonator Having An Operating Frequency And Method Of Extending Same" filed January 13, 2000 and having U.S. Serial No. 09/482,670, now U.S. Patent No. 6,249,073, which, in turn, claims the benefit of U.S. provisional application entitled "VHF Free-Free Beam High-Q Micromechanical Resonators", filed January 14, 1999 and having U.S. Serial No. 60/115,882. This application also claims the benefit of U.S. provisional application entitled "Transceiver Front-End Architectures Using Vibrating Micromechanical Signal Processors" filed April 20, 2000 and having U.S. Serial No. 60/199,063.

In The Claims

Please amend claims 1, 5, 13, 14, 19, 21, and 23 as shown below.

1. (Amended) A method for filtering signals to obtain a desired passband of frequencies, the method comprising:

providing a micromechanical filter apparatus including a micromechanical resonator having a fundamental resonant mode formed on a substrate and a support structure anchored to the substrate to support the resonator above the substrate; and

vibrating the resonator so that the apparatus passes a desired frequency range of signals while substantially attenuating signals outside the desired frequency range, wherein the support structure is attached to the resonator and the support structure and the resonator are both dimensioned so that the resonator is isolated from the support structure during

resonator vibration, wherein energy losses to the substrate are substantially eliminated and wherein the apparatus is a high-Q apparatus.

5. (Amended) A micromechanical filter apparatus for filtering signals to obtain a desired passband of frequencies, the apparatus comprising:

a substrate;

[a plurality of intercoupled micromechanical elements including] a first micromechanical resonator; and

a support structure anchored to the substrate to support the [elements] resonator above the substrate wherein the support structure and the resonator are both dimensioned so that the resonator is isolated from the support structure during resonator vibration wherein energy losses to the substrate are substantially eliminated and wherein the apparatus is a high-Q apparatus.

13. (Amended) The apparatus as claimed in claim 5 wherein the [apparatus] resonator is a silicon-based [filter apparatus] resonator.

14. (Amended) The apparatus as claimed in claim 5 wherein the [apparatus] resonator is a diamond-based [filter apparatus] resonator.

19. (Amended) The apparatus as claimed in claim 5 [wherein the plurality of intercoupled micromechanical elements includes] further comprising a second micromechanical resonator, the first and second resonators forming a pair of intercoupled end resonators.

21. (Amended) The apparatus as claimed in claim 19 [wherein the plurality of intercoupled micromechanical elements further includes] further comprising an inner resonator intercoupled to the end resonators.

23. (Amended) The apparatus as claimed in claim 21 [wherein the plurality of intercoupled micromechanical elements further include] further comprising a plurality of coupling links for coupling the inner resonator to the end resonators.